

LSI Docket No. 03-0554

Remarks

In the second Non-Final Office Action mailed on 28 November 2005, the Examiner objected to the specification and rejected claims 1-15, 17-19, and 21 under 35 U.S.C. §103(a) as being unpatentable over Tawill et al. (United States Patent Number 6,622,163) variously in view of Flynn (United States Patent Number 6,954,881) or in view of Flynn and official notice of that which is well known in the art as evidenced by Ciolli et al. (United States Patent Publication Number 2002/0141618).

Applicant has amended the specification to overcome the Examiner's objection thereto and has amended claims 1, 9, 10, 13, 18, and 19 to overcome the Examiner's rejections, for editorial clarity, and to better protect the invention. Applicant traverses the Examiner's rejection of all remaining claims and respectfully requests reconsideration and withdrawal thereof.

Objection to the Specification

The Examiner objected to the specification due to the presence of hyperlinks and required deletion thereof. Although incorporation by reference through a hyperlink is invalid, mere reference to a hyperlink as in the subject application as background information evidencing that which is readily known to those of ordinary skill in the art is permitted. The MPEP states that the Patent Office will render such links "inactive" for purposes of online publication. MPEP §608.1 states that:

Where the hyperlinks and/or other forms of browser-executable codes themselves rather than the contents of the site to which the hyperlinks are directed are part of applicant's invention and it is necessary to have them included in the patent application in order to comply with the requirements of 35 U.S.C. 112, first paragraph, and applicant does not intend to have these hyperlinks be active links, examiners should not object to these hyperlinks. The Office will disable these hyperlinks when preparing the text to be loaded onto the USPTO web database.

The noted hyperlinks of the specification are not improper attempts to incorporate by reference but rather merely point a reader to helpful background information evidencing that which is known in the art. Thus the hyperlinks to background information enables the invention as required under 35 U.S.C. §112. In hopes of advancing prosecution of this application, Applicant has amended the specification to remove the

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"http://" prefix of each hyperlink to thus aid in rendering the embedded hyperlink references inactive for purposes of browsing online. Applicant further hereby requests that the Patent Office render such hyperlinks inactive in any online publications thereof.

In view of the above discussion and the amendments to the specification, Applicant respectfully requests reconsideration and withdrawal of the objection to the specification.

35 U.S.C. §103 Rejections

The Examiner rejected claims 1-8, 10-12, 14-15, 17, 19, and 21 under §103(a) as unpatentable over Tawill in view of Flynn and rejected claims 9, 13, and 18 under §103(a) as unpatentable over Tawill in view of Flynn and further in view of official notice as to that which the Examiner asserts is well known and shown in Ciolli. As regards claim 1, the Examiner suggests that Tawill teaches the claimed method steps including use of a unique identifier associated with the path that generated the SCSI2 reservation request. The Examiner notes that Tawill is less than clear as to how such an ID would be used in the SCSI2 to SCSI3 translation process. Tawill simply suggests such ID information may be stored in a memory medium but does not suggest how such IDs may be used. The Examiner then suggests that Flynn provides a clearer teaching. The Examiner suggests that Flynn teaches SCSI2 to SCSI3 translation as "open option" translation to SCSI3 persistent reservation commands. The Examiner suggests that Flynn teaches generation of an ID that is useful to allow multiple paths of a cluster to access a shared logical unit. The Examiner further suggests that Flynn teaches his pseudo driver therefore generates a unique identifier for each path to an attached host/application. The Examiner suggests that one of ordinary skill would be motivated to combine the references to provide "the added benefit of load balancing to the paths and also lets path failover be used to prevent a node from performing a node failover when an I/O error occurs on a single device path."

Applicant respectfully traverses the Examiner's rejection. First and foremost, Flynn does not teach translation of SCSI2 reservation requests to SCSI 3 persistent reservation exchanges at all. Flynn is simply addressing the needs of a cluster computing environment to share access to common storage in a multi-path clustered computing

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environment. Flynn makes clear that, to utilize his improvements in a multi-path environment, all computing devices of the cluster must support SCSI3 persistent reservation for the invention to function. At column 8, starting at line 20, Flynn states:

Thus, according to the present invention the implementation of SCSI3 persistent reserve commands in a pseudo device driver allows for support of both single path to a LUN and multiple paths to a LUN configuration. With the single path configuration, Reserve/Release function to a LUN is implemented by SCS12 normal Reserve/Release command at the system disk driver level.

To implement this command in multipath configuration environment, all paths to a LUN on one host have to register with a LUN under the same Reservation Key, and only one of the paths needs to make the persistent reserve to the LUN with the reservation type of 'Exclusive Access, Registrants Only' at open time. All paths to the LUN from other hosts can register to the LUN all the time, but must be required to get persistent reservation to this LUN before they can access it. With this reservation type, all the paths on one host, which are registered to that LUN can share and access this LUN. If this pseudo device driver is applied to a storage subsystem which does not support SCSI3 Persistent Reserve commands, the pseudo device driver will switch to single path function automatically with a multiple path configuration of storage subsystem.

In a single path environment, SCS12 reserve/release is used though Flynn does not discuss how such reserve/release exchanges are generated. In a multi-path environment, according to Flynn, all paths from all hosts coupled to a storage volume must use SCSI3 persistent reservation exchanges (e.g., register with reservation keys, etc.). The SCSI3 reservation exchanges in Flynn are generated in response to parameters (options) associated with an "open" function call to open file or block level access to a storage volume. Nothing in Flynn relates to a translation process to translate a SCS12 reservation exchange into a corresponding SCSI3 reservation exchange. The standard "open" function call in an application is augmented in some unspecified manner in Flynn presumably by adding parameter values that help manage and coordinate the SCSI3 persistent reservations among a plurality of hosts having multiple paths to a shared storage volume.

Further, even the "translation" of "open options" into SCSI3 exchanges (while not suggestive of SCS12 to SCSI3 translations) is not transparent with respect to the system/application that generates the requests to be translated as required by recitations of claim 1. Rather, the application must be modified to generate appropriate parameters

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(options) for the "open" function invocation. By contrast, the claimed invention as recited in, for example, claim 1 must be transparent with respect to the application or system that generates the request to be translated.

Still further none of the art of record (considered individually or in any combination) teaches or reasonably suggests that the method/structure is useful in the context of a storage system adapted to couple to a heterogeneous mix of systems that support only SCSI2 reservation exchanges and systems that directly support SCSI3 persistent reservation protocol exchanges.

As can be seen from the above discussion, numerous aspects of, for example, rejected claim 1 are not taught or reasonably suggested by the art of record considered individually or in any combination.

in addition to the combination failing to show every element of, for example, claim 1, Applicant also disagrees with the Examiner's assertion that there is any suggestion or motivation for the proposed combination in the art. Admittedly both references relate to SCSI storage management issues. However, Flynn is addressing a very different problem in that context than is Tawill and hence there is no motivation for the combination of Tawill and Flynn. Flynn's use of generated key values indicating a path associated with a request has nothing to do with the SCSI2 to SCSI3 translations of Tawill. Nothing in Tawill (or the art as a whole) suggests a need to modify Tawill to support multiple paths between host systems and storage volume. Conversely, nothing in Flynn (or the art as a whole) suggests a need to utilize Flynn's unique identifiers that identify an associated path to enhance a translation from SCSI2 to SCSI3 reservation protocol exchanges in a manner transparent to the system generating a SCSI2 request. The Examiner's purported motivation rests only in the benefit realized by Flynn's multi-path architecture if applied to the teachings of Tawill. Benefits of path failover as compared to node failover as well as transparent support of a heterogeneous mix of SCSI2 and SCSI3 host systems communicating with a SCSI3 storage system are benefits of the claimed invention. However, the Examiner points to nothing in the art to suggest such a benefit leaving only the teachings of the subject application to suggest such benefits from a structure and method to support SCSI2-SCSI3 reservation exchange

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translations in the context of a multi-path computing cluster. Such hindsight engineering applying the teachings of the subject application is improper.

In view of the above discussion and the amendments to claim 1, Applicant maintains that claim 1 is distinguished from the art of record, considered individually or in any combination. Independent claims 10 and 15 were rejected for similar reasons and have been similarly amended. For at least the same reasons as above, claims 10 and 15 are maintained to be allowable over all art of record, considered individually or in any combination. Dependent claims 2-9, 11-14, 17-19, and 21 depend from these base claims and are therefore maintained to be allowable for at least the same reasons as above and as dependent from allowable base claims. Remaining claims 1-15, 17-19, and 21 are therefore maintained to be allowable and Applicant respectfully requests reconsideration and withdrawal of the rejection of all remaining claims.

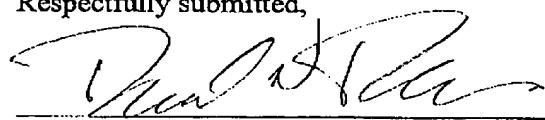
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Conclusion

Applicant has amended the specification to overcome the Examiner's objection thereto and has amended various claims for editorial clarity, to better protect the invention, and to overcome the Examiner's rejection. Applicant has thoroughly addressed the Examiner's §103 rejection and requests reconsideration and withdrawal of same.

No additional fees are believed due. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney.

Respectfully submitted,



Daniel N. Fishman #35,512
Duft Bornsen & Fishman, LLP
1526 Spruce Street, Suite 302
Boulder, CO 80302
(303) 786-7687
(303) 786-7691 (fax)